APPENDIX W

PETROLEUM AND GEOTHERMAL POTENTIAL

PETROLEUM POTENTIAL

Subsurface data is very limited as described in the report, "Oil and gas potential in the Cascade RMP" (Moore 1984). However, parts of the Cascade Resource Area (RA) are considered to have some potential for petroleum resources. However, with respect to the more promising areas in the Overthrust belt of eastern Idaho, the petroleum potential of the Cascade RA is relatively low.

Map 3-11 displays the petroleum potential of areas within the Cascade RA with respect to their geologic setting in Idaho.

Western Snake River Plain - Generally low potential for petroleum (natural gas) resources. A low to medium potential has been assigned to the area of numerous gas shows in exploratory wells in the Payette area.

The best potential for petroleum resources in the RA is within the western Snake River Plain. The petroleum potential of the western Snake River Plain is difficult to assess because of the persistent volcanic cover, low density of exploratory drillings, and a paucity of subsurface geophysical data. However, non-marine, carbonaceous sedimentary rocks that are intercalated with volcanic sequences beneath the Snake River Plain may have some potential as organic-rich source rocks. Numerous gas shows from exploratory wells on the Snake River Plain, particularly near the Payette area, indicate the presence of at least some minor accumulations of methane and related gases. Methane associated with ground water systems has also been reported from many water wells throughout the western Snake River Plain. The presence of larger commercial accumulations of gas is presently unknown. The western Snake River Plain is considered as "prospectively valuable" for petroleum resources (natural gas).

Idaho Batholith - Zero potential.

The widespread presence of plutonic rocks of the batholith precludes the presence of oil and gas in this area.

Columbia River Basalt Plateau - Zero to low potential.

This region is associated with the thick cover of the Miocene Columbia River Basalt. The Columbia Plateau is largely unexplored and the subsurface largely unknown because of the vast volcanic cover. Conventional geophysical techniques have been unable to penetrate the basalts. In the western part of the area along the Snake River, a variety of Pre-Tertiary rocks crop out discontinuously through the basalt. These Pre-Tertiary rocks consists mostly of a wide-range of late Paleozoic through Triassic volcaniclastic sedimentary, metasedimentary, and metavolcanic rocks. Although some of the marine sedimentary rocks may have some minor potential, the high degree of metamorphism of many of these rocks indicates a poor chance for accumulation of petroleum resources.

Carbonaceous Tertiary sedimentary rocks underlying Columbia River basalt in Washington have yielded some gas shows and have attracted industry interest in the past few years. Although the Columbia River basalts probably overlap batholith rocks to the east and Pre-Tertiary metamorphic rocks to the west, accumulations of non-marine carbonaceous sedimentary rocks may underlie central parts of this area within the RA. Therefore some minor potential cannot be ruled out.

Outlook for Petroleum Exploration in the Cascade RA

Extensive industry exploration in the Cascade RA in the immediate future is very unlikely, considering the recent downturn in the petroleum industry and the extremely speculative potential of the area. However, as in the past, when petroleum industry conditions improve, sporadic exploration activity can be anticipated on the western Snake River Plain.

Improved magnetotelluric geophysical methods on the Snake River Plain and the Columbia Plateau hold promise that knowledge of the subsurface and the petroleum potential can be improved.

Petroleum Potential Categories for the Cascade RA

Zero Potential = No potential for petroleum resources. No geologic evidence to indicate the presence of potential source rocks, reservoir rocks, trapping mechanisms, or favorable thermal history required for petroleum accumulation.

Zero to Low Potential = Little evidence of characteristics necessary for petroleum accumulations. Although the subsurface is poorly known, the presence of rocks favorable for petroleum resources could conceivably be masked by surface volcanic cover.

Low Potential = Some geologic indication of petroleum potential, particularly natural gas. Although knowledge of the subsurface is poor, the presence of thick carbonaceous sedimentary sequences which could serve as possible petroleum source rocks are present at depth.

Low to Medium Potential = Concentration of gas shows in exploratory wells indicate an increased favorability for at least minor gas accumulations.

Refer to Map 3-11 for a display of these categories within the Cascade Resource Area.

GEOTHERMAL POTENTIAL

Refer to Map 3-12 for a display of the geothermal potential in the Cascade Resource Area.

Geothermal Regions

Snake River Plain - Characterized by warm to moderate temperature (40°-150°) regional thermal aquifer systems.

Idaho Batholith - Characterized by warm to moderate isolated and localized fault or fracture controlled systems.

Columbia Basalt Plateau - The existence of thermal resources in this area is largely unknown. The area is probably partially underlain by the Idaho Batholith in the eastern one third of the area and therefore contains localized fracture controlled systems. The remainder of the area may contain isolated small low to moderate temperature systems.

Potentials

Potentials are for low to moderate temperature (40°-150°) geothermal resources. Potential for high temperature (>150°C) geothermal resources is zero to low and largely unknown for the entire Cascade Resource Area.

Zero to Low - Areas that are largely unknown but may have some potential based on higher than normal heat flow.

Low - Area contains scattered warm wells and springs and favorable geologic structures.

Moderate - Area contains numerous thermal wells and springs that appear to be related hydrologically.

High - Area contains developed systems or systems that are well defined based on geologic and hydrologic data.

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